T-79.5102

Special Course in Computational Logic (4 cr)

Autumn 2007

Practical Arrangements

Lectures: Mondays, 12-14, room TB353
Lecturer: Docent, D.Sc.(Tech.) Tomi Janhunen, office TB335, tel. 09 451 3255, email @tkk.fi
Tutorials: Tuesdays, 15-16, room TB353
Course assistant: M.Sc.(Tech.) Antti Hyvärinen, office TB358, tel. 09 451 4774, email @tkk.fi
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Agenda for Autumn 2007

- Contents according to the TKK Study Programme 2007–2008:
  Knowledge representation, reasoning, and decision-making.
  Automated reasoning.
- The course concentrates on declarative programming which is much about specifying what is to be computed rather than how the computation actually takes place.
- From the methodological point of view, the course provides an in-depth introduction to answer set programming (ASP) which is a new rule-based approach to constraint programming.

Formal Course Requirements

Course credits (4 cr) are granted on the following basis:

1. Three home assignments are made.
   - Modelling the given problem domain using rules
   - Using ASP tools to find a solution
   - Grading on scale 0–5 (a nonzero grade is required to pass)
2. An examination is passed with a grade 1–5.
   - The first exam is arranged on the 17th of December, 2007, 9–12, in hall T1.
   - Additionally, two other exams are arranged in 2008.

The course grade is based on the exam (70%) and the home assignments (30%, i.e., 10% weight is given for each assignment).
Course Material

- Lecture notes
- Questions from tutorials
- Articles and links
- Tools and manuals
- References to other similar courses
- Supplementary reading (not required):


Course Contents in Detail

Period I: Practical Introduction to ASP (lectures 1–6)
1. Introduction
2. Basic concepts
3. Negation and non-monotonicity
4. Further primitives
5. Extensions
6. Applications

Period II: Theoretical Background of ASP (lectures 7–12)
1. Complexity and approximations
2. Implementation techniques
3. Equivalence checking
4. Modular program development
5. Relationship with propositional logic
6. Further topics

General Objectives

- In-depth understanding of the ASP methodology
- Practical modelling/programming skills
- Knowledge of current ASP tools and systems
- Awareness of some applications and their main characteristics
- Basic understanding of the theoretical background of ASP and its relationship to other similar disciplines

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